REMARKS

Claims 1-27 are pending in the present application. Claims 2 and 3 were canceled; claims 1, 4, 7, 11, 12, 14 and 16-27 were amended. Reconsideration of the claims is respectfully requested.

I. Double Patenting

The Examiner has rejected Claims 1-27 under the judicially created doctrine of double patenting over Claims 1-28 of U.S. Patent Application No. 09/969,377. Applicant is submitting concurrently herewith a terminal disclaimer to overcome this rejection.

II. 35 U.S.C. § 102, Alleged Anticipation, Claims 1-3

The Office Action rejects claims 1-3 under 35 U.S.C. § 102(b) as being anticipated by *Steeby* (U.S. Patent No. 5,940,786). This rejection is respectfully traversed.

With regard to claims 1-3, the Office Action states:

> In Steeby, please note: measuring a temperature in a device (50,18,36), Comparing the temperature to a first threshold (52,56), Decreasing the throughput of the device (12,12') if the temperature exceeds the first threshold (58,60), as throughput is decreased when the frequency is decreased. Note that when the frequency is decreased, there is also a corresponding limit set to the number of requests that can be processed in a given time period, as a given clock frequency will allow a fixed number of requests to be serviced during any given time period.

(*Office Action* dated June 30, 2004, page 2.) Amended claim 1 reads as follows:

> 1. A method of managing power in a storage controller, comprising:
> measuring a temperature in a storage controller;
> comparing the temperature to a first threshold; and
> decreasing the throughput of the storage controller by setting a limit to a number of input/output requests to be processed in a given time period if the temperature exceeds the first threshold.

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re bond*, 910 F .2d 831, 832, 15 U.S.P.Q.2d 1566,

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1567 (Fed Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 21 U.S.P.Q.2d 1031, 1034 (Fed Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F .2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983). Applicant respectfully submits that *Steeby* does not teach every element of the claimed invention arranged as they are in claim 1 of the present invention.

Specifically, *Steeby* does not teach measuring the temperature in a storage controller and regulating the temperature of the storage controller by reducing the amount of input/output requests to the storage controller. Rather, *Steeby* teaches:

> A system and method for regulating temperature of a microprocessor include an oscillator having a frequency which varies based on temperature of the microprocessor wherein the oscillator is connected to the clock input of the microprocessor. The system and method allow operation of the microprocessor at reduced clock frequencies in an attempt to reduce heat generation and stabilize the microprocessor temperature prior to occurrence of a permanent failure due to an operation at excessive temperature.

(*Steeby*, Abstract).

As shown above, *Steeby* teaches regulating the temperature of a microprocessor by varying the clock rate of the microprocessor. *Steeby* regulates the temperature of a microprocessor by reducing the clock rate of a microprocessor in order to reduce heat generation and the occurrence of a permanent failure due to operation at excessive temperatures. However, *Steeby* makes no mention of setting a limit to the number of input/output requests that may be processed in the time period. Thus, *Steeby* is not concerned with the number of requests processed within a given time period, but rather the rate at which requests are processed by the microprocessor in order to regulate the temperature. Limiting the amount of input/output requests a storage controller processes during a period of time in the present invention does not, and would not, affect the speed or clock rate of a microprocessor. Thus, *Steeby* does not teach every element of the claimed invention arranged as they are in claim 1 of the present invention.

Therefore, the rejection of claim 1 under 35 U.S.C. § 102(b) as being anticipated by *Steeby* has been overcome.

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As claims 2 and 3 have been canceled, the rejection of claims 2 and 3 under 35 U.S.C. § 102(b) as being anticipated by *Steeby* is now moot.

III. 35 U.S.C. § 102, Alleged Anticipation, Claims 1-3

The Office Action rejects claims 1-3 under 35 U.S.C. § 102(b) as being anticipated by *Ang* (U.S. Patent No. 5,870,614). This rejection is respectfully traversed.

With regard to claims 1-3, the Office Action states:

> In Ang, please note: throughput is addressed in column 2, lines 51-68 such that a decrease in temperature is linked to a decrease in the number of ops required per data. Also note that the device is shown in Figure 2, such that a temperature is measured at 102, the temperature compared to a threshold at 104, such that throughput is decreased upon exceeding the threshold at 106. Clock frequency reduction is mentioned at column 4, lines 20-22. Throughput is decreased by setting a limit to the number of requests to be processed in a given time period, as ANG switches to decreased throughput scenarios based upon 106, also noting that throughput can be increased in 110.

(*Office Action* dated June 30, 2004, pages 2-3.)

Applicant respectfully submits that *Ang* does not teach every element of the claimed invention arranged as they are in claim 1 of the present invention. Specifically, *Ang* does not teach measuring the temperature in a storage controller and regulating the temperature by setting a limit to the number of input/output requests to be processed by the storage controller. *Ang* teaches:

> To this end, the invention provides a control system as specified in the preamble, wherein the control means is operative to effectuate switching the processing unit from a current process to another process that is less compute-intensive than the current process. The switching occurs in response to the sensor indicating the temperature having increased beyond a pre-specified threshold.

(*Ang*, col. 2, lines 27-34).

As shown in the passage above, *Ang* teaches regulating the temperature of a microprocessor by switching to a less compute-intensive process. This switching from a more-intensive process to a less-intensive process occurs in response to a sensor indicating the temperature having increased beyond a pre-specified threshold. This

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switching merely reduces the number of operations that are processed by the microcontroller until an acceptable temperature has been reached. However, Ang does not teach that there is a limit to the number of requests that may be processed. Thus, although *Ang* mentions reducing the number of operations, *Ang* fails to teach setting a limit specifically to the number of input/output requests to be processed.

Therefore, the rejection of claim 1 under 35 U.S.C. § 102(b) as being anticipated by *Ang* has been overcome.

As claims 2 and 3 have been canceled, the rejection of claims 2 and 3 under 35 U.S.C. § 102(b) as being anticipated by *Ang* is now moot.

IV. 35 U.S.C. § 103(a), Alleged Obviousness, Claims 4-27

The Office Action rejects claims 4-27 under 35 U.S.C. § 103(a) as being unpatentable over *Ang* (U.S. Patent No. 5,870,614) in view of *Mittal et al.* (U.S. Patent No. 5,719,800). This rejection is respectfully traversed.

With regard to claim 4, the Office Action states:

> Ang is discussed initially above, pertaining to claims 1-3. However, in claims 4+, it is required that a determination of a request limit having been reached be made, with processing to continue if the limit has not been reached. In review, Ang clearly shows that temperature is measured at 102, clearly in response to the expiry of a predetermined wait time at 108, which is tantamount to a timer interrupt. Temperature is measured at 102, in a data transfer device/data processing device 202, and compared to at least a first temperature range of 104, and a setting of a request limit to SCEN:=1 if the temperature threshold is within a first range and not exceeded, which then warrants the reduction of throughput via incrementing of the SCEN to include less intensive processing. Below is a first threshold is Tref and the first value is SCEN:=1. A first/second value of "0" is set forth by Ang, by putting the processor on hold, per column 4, lines 20-22. An embedded I/O controller is seen in Ang's use in a video server, column 3, lines 7-12. The method is performed by a control processor 206/202. A temperature sensor is explicitly shown at 204, as is the control processor 206/202. The ultimate use is in a computer program product.
> Mittal shows the missing teaching, that being the use of an activity level on which to decrease throughput. The activity monitor 106 monitors recent utilization of the unit 105, which is in response to a data transfer request in the form of the current activity 108 describing a current task or operation. If the activity level 109 exceeds a threshold, then unit 105 is

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> placed into a reduced power mode in a throttling condition, which is a lowering of instruction rates per column 3, lines 14-17. It is suggested to use this strategy in combination with a clock rate reduction (column 7), or in conjunction with temperature monitoring (column 5, lines 30-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify the teachings of Ang by the teachings of Mittal so that better temperature control can be achieved, by not only checking actual temperature to determine decreased throughput, but by also checking the actual activity level to a threshold determined by the temperature, and adjusting the throttling in response thereto. Thus, during a data transfer request, it is seen that a determination is made if an activity level has been exceeded, and if so, throttling is effected. If the activity level has not been exceeded, then processing is continued. As pointed out above, combination is explicitly taught by Mittal.

(*Office Action* dated June 30, 2004, pages 3-4.) Amended independent claim 4, which is representative of amended independent claims 16 and 27, reads as follows:

> 4. A method of managing power in a storage controller, comprising:
> in response to a predetermined event, measuring a temperature in a data transfer device, comparing the temperature to at least a first temperature range, and setting an input/output request limit to a first predetermined value if the temperature is within the first temperature range;
> in response to a input/output request, determining whether the input/output request limit has been reached, and processing the input/output request if the input/output request limit has not been reached.

The *Ang* reference still does not teach or suggest the feature of setting an input/output request limit, as argued in the response to claim 1 above. Applicant also agrees with the examiner that *Ang* does not teach determining whether the input/output request limit has been reached and processing the request if the limit has not been reached. However, Applicant disagrees with the examiner that *Mittal* teaches these features.

The Office Action alleges that *Mittal* teaches the use of an activity level for decreasing throughput. The activity level in *Mittal* is compared to a threshold value. If the activity level exceeds the threshold value, the functional unit is placed into a reduced power mode. If the activity level is less than the threshold value, the functional unit is restored to the normal mode. However, this threshold value in *Mittal* is not the same as

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an input/output request limit, as recited in claim 4 of the present invention. *Mittal* teaches, at column 5, lines 55-61, that the threshold value is set based on profiling the realistic worst-case power consumption benchmark being used in the design of the particular IC. Thus, the threshold value in *Mittal* is set based on past history of the IC power consumption, while claim 4 of the present invention recites setting an input/output request limit based on whether the temperature measured is within a particular temperature range.

Since the threshold value as taught in *Mittal* is not the same as an input/output request limit by nature of the way the threshold and the input/output limit are set, it follows that *Mittal* does not teach determining whether input/output request limit has been reached or processing the input/output request if the input/output request limit has not been reached.

Furthermore, even if one were to combine the teachings of *Ang* and *Mittal*, the resulting combination would not be determining whether an input/output limit, which is set if the temperature is within a temperature range, has been reached, and processing the input/output request if the input/output limit has been reached. Rather, the resulting combination would be determining whether the activity level exceeds the threshold, set by profiling the power consumption benchmark, and restoring the functional unit to a normal mode if the threshold is less than the threshold. Therefore, the combination of *Ang* and *Mittal* still would not reach the presently claimed invention.

Thus claims 4, 16 and 27 are patentable over the cited references because the combination of the *Ang* reference with *Mittal* does not teach nor suggest the presently claimed invention.

Claims 5-15 are dependent claims depending on claim 4. Claims 17-26 are dependent claims depending on claim 16. As Applicant has already demonstrated that independent claims 4 and 16 are patentable over the *Ang* and *Mittal* references, Applicant submits that dependent claims 5-15 and 17-26 are patentable over the *Ang* and *Mittal* references at least by virtue of depending from an allowable claim.

Therefore, the rejection of claims 4-27 under 35 U.S.C. § 103(a) has been overcome.

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V. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

DATE: 9/30/04

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